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Samuel E. Gralla* (sgralla@email.arizona.edu), Tucson, AZ. *Gravitational Waves and the Aretakis Instability.*

The field of black hole stability lies at the boundary of mathematics and physics and has enjoyed a productive interaction between the two communities. Recently, the mathematician Aretakis discovered an instability of extremal black holes that had been overlooked by physicists. We have recovered the instability using physics techniques and generalized to the more realistic setting of nonaxisymmetric perturbations of near-extremal black holes. This forms a foundation for determining the physical, and ultimately observational, consequences of the instability. Special attention will be given to gravitational radiation from rapidly rotating black holes. (Received September 26, 2017)